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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/619,574

07/14/2003

Volker Westphal

UNIVP115USA

7091

7590

12/30/2004

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EXAMINER

LEE, HWA S

ART UNIT

PAPER NUMBER

2877

DATE MAILED: 12/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.	Applicant(s)	
	10/619,574	WESTPHAL ET AL	
	Examiner	Art Unit	
	Andrew Hwa S. Lee	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-10, 15-19 and 21-23 is/are rejected.
- 7) ☒ Claim(s) 5, 11-14, 20 and 24 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1/8/04</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims **1-4, 6-10, 15-19, and 25** are rejected under 35 U.S.C. 102(b) as being anticipated by Westphal et al ("Quantitative OCT Image Correction Using Fermat's Principle and Mapping Array," Proceedings of the SPIE, SPIE, Bellingham, VA, US, vol. 4619, January 21, 2002).

Westphal et al ("Westphal" hereinafter) shows qualitative OCT image correction comprising:

from the obtained OCT data, identifying the at least one interface; and
correcting the OCT data for distortion at the at least one interface. (Please see Abstract)

With regards to **claim 2**, Westphal shows the distortion at the at least one interface is refraction (Abstract).

With regards to **claim 3**, Westphal shows the correcting the OCT data for refraction includes:

determining a minimum optical pathlength for a plurality of points corresponding to the obtained OCT data; and

transforming the determined minimum optical pathlength into a physical pathlength (pages 55 and 56).

With regards to **claim 4**, Westphal shows the transforming step includes a backwards transformation (page 55).

With regards to **claim 6**, Westphal shows removing image distortions due to at least one of (i) nonlinear axial scan velocity, (ii) nonlinear lateral scan velocity, and (iii) non-telecentric scan geometry

With regards to **claim 7**, Westphal shows the OCT data is corrected using one of (i) forward mapping and (ii) backward mapping (page 55).

With regards to **claim 8**, Westphal shows the layered media is the eye (Figure 4).

With regards to **claim 9**, Westphal shows the at least one interface includes an epithelial interface (Figure 4).

With regards to **claim 10**, Westphal shows the at least one interface further includes an endothelial interface (Figure 4).

With regards to **claim 15**, Westphal shows a quantitative image correction method for optical coherence tomography (OCT), said method comprising:

correcting for external distortions caused by
scan geometry (page 55); and
correcting for intrinsic distortions within a sample (bottom of page 56).

With regards to **claim 16**, Westphal shows the intrinsic distortions are caused by
refraction at at least one interface within the sample (bottom of page 56).

With regards to **claim 17**, Westphal shows correcting for external distortions includes
correcting for non-telecentric image distortions (top of page 56).

With regards to **claim 18**, Westphal shows correcting for external distortions includes
correcting for distortions caused by at least one of (i) nonlinear axial scan velocity and (ii)
nonlinear lateral scan velocity (bottom half of page 55).

With regards to **claim 19**, Westphal shows correcting for internal distortions includes:
identifying the at least one interface in the OCT image; and
correcting OCT data for distortion at the at least one interface (bottom 4 lines of page
56).

With regards to **claim 25**, Westphal shows:
obtaining optical coherence tomography (OCT) data from the eye;
from the obtained OCT data, determining a position of (i) the epithelium, (ii) the
endothelium and (iii) the iris; and

correcting image data distortions caused by at least one of (i) a first interface including the epithelium and (ii) a second interface including the endothelium (Figure 4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang et al (US 6,293,674) in view of Westphal.

Huang et al show a data acquisition system and processor for diagnosing eye disease.

Huang et al do not show the image correction.

Westphal shows segmenting anatomical structures in the anterior portion of the eye to detect at least one interface, and (iii) correcting for refraction effects at the at least one detected interface.

At the time of the invention, one of ordinary skill in the art would have used the apparatus of Huang et al with the method for image correction of Westphal in order to obtain OCT image data with reduced errors.

With respect to **claim 22**, Huang et al show the OCT data acquisition system includes:
an optical radiation source (100);
a reference arm (170) and a sample arm (180) each
coupled to the optical radiation source via a beam splitter (160); and a detector (290) coupled to the beam splitter for receiving optical radiation from the sample arm and the reference arm.

With respect to **claim 23**, Westphal shows that the image correction process removes image distortions due to at lease one of (i) nonlinear axial scan velocity, (ii) nonlinear lateral scan velocity, and (iii) non-telecentric scan geometry.

Allowable Subject Matter

Claims 5, 11-14, 20, and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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The following is a statement of reasons for the indication of allowable subject matter: The prior art of record fails to show or to suggest image correction for optical coherence tomography comprising all the steps as presently claimed further comprising the steps of:

transforming the obtained OCT data into a binary image;

searching a plurality of OCT image data columns sequentially for upper and lower boundaries of the at least one interface;

based on the searching step, assigning interface data points based on a set of predetermined rules regarding the at least one interface;

applying a first predetermined geometric fit to the assigned interface points of the at least one interface;

applying a plurality of predetermined rejection rules to the assigned interface points;

rejecting assigned interface points according to the predetermined rejection rules; and

applying a second predetermined geometric fit to any remaining assigned interface points.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Hwa S. Lee whose telephone number is 571-272-2419. The examiner can normally be reached on Tue-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on 571-272-2800 ext 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Andrew Hwa S. Lee', with a stylized, cursive script.

Andrew Hwa S. Lee
Examiner
Art Unit 2877